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## **From Fragmentation to Congruence - Designing an Interdisciplinary Project Course**

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In the last six years the faculty of the University of Copenhagen (UCPH) has increased its staff of temporary teachers (such as PhD's, Postdocs and external lecturers) from 36% to 67% (Baggersgaard 2015). This has probably had a profound, but still largely unrecognized, impact on the quality of teaching, especially for many of the newly established interdisciplinary educational programmes in which research-based teaching and continuity are thought to be of high importance.

This text aims at describing and analyzing my personal experience with this development. I will show how difficult it can be to design a good interdisciplinary course from scratch when you “come in from the cold” and have little or no experience with neither the educational programme nor the staff involved. I will also try to show how team-teaching together with an experienced teacher does not necessarily solve all problems, and how an interdisciplinary agenda creates several additional challenges to think about.

My main message will be that course alignment is the most important aspect to watch out for when designing a new interdisciplinary course (Biggs & Tang 2011b). However, alignment is not only about establishing a constructive link between learning goals, teaching methods and assessments. It also includes inquiry into student backgrounds, ongoing negotiations of learning expectations, the existence (or rather non-existence) of faculty support, and the activation of tacit knowledge among colleagues. In the literature this nexus of teaching and learning environments has been coined ‘congruence’ (Hounsell & Hounsell 2007), which will be my contin-

uous guidepost by which to analyze my experiences and think about future improvements.

## Background

Having worked as a journalist for many years and having experienced a profession in decline, I decided to go back to academia in order to teach and do research in my areas of interest. Soon I got a Postdoc position in interdisciplinary education and subsequently was asked to participate in the development and teaching of a new third-semester course called ‘Interdisciplinary Project Course’ (IPC) at a newly established two-year Masters programme (MSc) on Climate Change at the Faculty of Science, UCPH. With a PhD in complex systems and some practical experience in climate communication, my background was certainly not ideal for such an assignment.

So here I was. Back in the ivied halls and no clue. Luckily I wasn’t all alone. The teacher who approached me for the assignment offered to team-teach the IPC course. This was a great help. We had a few meetings for planning and allotting the course tasks. As teammates we decided to be both present in all lectures, but to share the lecturing so that each of us would plan and teach what we knew best. But still: With a feeling of being marginally qualified, with little experience in university teaching, and without much knowledge about the programme or the teachers involved, how should I approach the challenge?

I tried to read everything available on the web and tackle the situation head on. I consulted the official learning goals, which stated to help students with the practical design (e.g. writing a synopsis) on a climate change related research project:

*“The course aims at developing the students’ capacities to formulate, design, plan and document a climate change related project. . . [Students will] individually or in groups develop their own research projects, with emphasis on the formulation of objectives, research questions, hypotheses, and methodology, including also plans for data collection and processing, modelling etc. These projects will be documented in the form of outlines of scientific papers.” (UCPH 2014)*

This was clearly a methodological agenda. Additionally, I read about the other courses in the MSc programme and decided to follow them online as

much as possible. The first and second semesters were structured as large introductory courses dealing with the ‘*hard sciences*’ of climate change and employing more than a dozen of lecturers from various science and economy departments. However, they did not cover much of the ‘soft sciences’, such as sociology, anthropology, law and philosophy. And since I understood my job to be one in which I offered new methodological approaches and alternative professional perspectives to the problems of climate change, I decided to prepare “traditional” lectures on the philosophy of science, on sociological studies (STS) of climate change, and on systems- and communication theory, again, always related to climate change issues.

Later on, this double agenda turned out to create problems. For example, as soon as the students had settled on a research project to write a synopsis on, my excursions in the philosophy of science and lectures on science communication fell on deaf ears. It turned out that students were much more strategic about their mental energy use than I had expected. Once they knew what project design to concentrate on for their short oral exam, the rest of the course contents quickly felt like fragmented noise without any sense of relevancy for them.

Of course, my stand as a temporary teacher and my lack of experience caused several additional problems. Here a list, compiled from other people’s feedback and own impressions:

- 1) Insecurities made me default far too often into traditional power point lecturing, sometimes exceeding an hour and a half.
- 2) My lack of (tacit) knowledge about other teachers and courses in the programme caused some misalignments and unnecessary repetitions.
- 3) Since my teammate knew our students well, I felt i couldn’t take time to ask about the student’s interests and expectations in the beginning of the course, making it hard for me to assess their competencies and react to their differences.
- 4) Thus, missing knowledge about student skills and cultural backgrounds caused me sometimes to overdo my teaching efforts - both in terms of contents quantity and level of difficulty.
- 5) I didn’t activate student very much except from good IRP-dialogue chains, making them more passive than necessary.

My team-teaching colleague definitely tried to adjust for some of the problems along the way, but since the course only lasted seven weeks and much preparation had already gone into the design of the course, there was neither much space nor time to change matters.

Some of the above problems are classical cases of constructive misalignments between learning goals, teaching methods and assessment methods (Biggs 1996). And looking back, it is true that I did not fully understand the implications of the research-design oriented learning goal description cited above. Instead of guiding students to choose and develop their own ideas, I saw it as my main job to broaden their horizons with topics they never had heard of. A few students definitely were inspired by this, but many were confused. Next time I will have to clarify that my main emphasis is not on the novel insights as such, but on the differing methodological tools these alternative perspectives on climate change employ in order to reach their conclusions.

In addition, I didn't yet know the tools and tricks of a truly interdisciplinary teaching style. Rather than synthesizing multiple perspectives continuously, my teaching was characterized by a kind of 'serial disciplinarity': a week-by-week change of perspectives, without much integration or bridge building in between. I knew from start this structure was not optimal, but I didn't know how to prevent it from happening.

My team-teaching colleague had some advice in this regard. If you want to be interdisciplinary, he said, you should continuously employ a change of perspective when talking about real life problems. Say, you talk about declining biodiversity. Try to engage student with questions like: "how would an economist look at this problem?", "what lessons would a priest draw from this development?", or "how would a neoliberal politician frame this fact?". These questions create splitting and interference in the normal thinking process, opening the discourse up for discussions about clashing value systems within the disciplines (and partly explaining why climate change is such a difficult problem to address).

## **Engaging students and colleagues**

I will teach the course again next year. Alone. And again as a temporary teacher. Partly in anticipation of my future responsibilities, I interviewed students and colleagues in the MSc programme in order to improve the course and to potentially collaborate with them on the course design and

contents next year. Students generally articulated cautious satisfaction with the course, saying that it was a good preparation for the thesis. But they also mentioned that it was “quite fragmented” and that there were “too many lectures”. This was something I would have to work to improve.

My interviews with colleagues on the other hand didn't lead to much enlightenment apart from pointing to a few disciplinary ‘threshold concepts’ (Meyer & Wenger 2003) to integrate into my course. The main reason for the rather lackluster engagement, I believe, is that there is no ‘community of practice’ (Wenger 1998) in climate change education at UCPH. In other words, there is no active, collaborating environment engaged in the teaching of climate change. The institution has not made any efforts to put support structures in place when initiating the MSc in Climate Change two years ago. Such efforts could have included making sure that interdisciplinary research and education is adequately valued and resourced by management, or by identifying interdisciplinary brokers, helping students to make sense of the overall picture. Most teachers hired for the programme have maintained allegiance to their respective disciplines (as the literature shows they normally do - see for instance (Diamond & Adam 1995, Jenkins 1996). Thus, very often, these geographers, climate modelers, physicists, and economists have an as limited understanding of the challenges of interdisciplinary educations as the students signing up for them.

## Designing a congruent course

When there is no community of educational practice to be part of, there cannot be any ‘legitimate peripheral participation’ (Lave & Wenger 1991) by temporary teachers like me (nor by the many researchers teaching in the programme). Thus, for the next iteration of the course, I will again solely have to rely on my (former) team-mate and my reading of relevant literature.

I will definitely do many things differently. The most important issue to address is the lack of constructive alignment between the learning goals, teaching methods and the exam. I already have written an analysis of this aspect in my CA-assignment for this course, and will, for this reason, not go much deeper into the many aspects of it. But what was interesting to realize when reading the feedback was that a privileged situation like mine (having a good collaboration with an experience teacher) might make it even *more difficult* to reach a common understanding of what the students can, what

the course is about, and design it accordingly. In addition, when you come in from the cold like I did, it is not always possible to prepare sufficiently just by reading the course material or talking with your teammate. There is a whole web of direct and indirect influences beyond your control, such as faculty coordination, unknown student aspirations, and evolving negotiations about values by which to judge the learning outcomes.

Such interrelationships might best be described by what Hounsell and Hounsell call 'congruence' in the teaching-learning environments (Hounsell & Hounsell 2007). While constructive alignment simply implies a kind of reverse engineering of class activities through the identification of learning goals and assessments methods, congruence takes into account local constraints and acknowledges the dynamic complexities of student-focused strategies (Trigwell & Prosser 1996).

So, in order to get a more congruent course next time, I wish to concentrate on the following aspects:

- 1) Take time in the beginning to understand student backgrounds and skills. This will equip me to adapt the curriculum, if needed. I will also take time in the beginning to discuss student expectations. The course is quite different from what they are used to. This requires inclusive negotiations about what the goals are, why they are important, and how to reach them.
- 2) Focus much more on what students need for their synopsis rather than on explorations of alternative perspectives on climate change. This implies an increasing use of small written assignments about the students' ideas and formative feedback (Black & William 1998, Bloom 1971). If the class is small enough, I will also try to give feedback both extrinsic and intrinsic (eg. both on submitted assignments and through day-to-day small-group tutoring - see (Bound & Falchikov 2007)).
- 3) Approach the course with a concrete overarching theme, this time the upcoming COP-21 climate negotiations in Paris, creating a sense of relevancy and trans-disciplinarity (which is a term used to describe a type of learning which goes beyond disciplinary boundaries in order to *resolve* real world problems - see for instance (Jantsch 1972) or (Klein 2008)).
- 4) A greater use of active learning methods (Olson & Riordan 2012, Prince 2004) such as role-playing, problem-based and peer-learning. Con-

cretely, I will facilitate two climate change negotiation role-playing games; create hands on exercises (in communication and systems theory) and engage students in one or two peer-learning situations (Bound et al. 1999).

- 5) Chop up lectures into smaller (preferably 20 minute) pieces, concentrating on 'threshold concepts' (Meyer & Wenger 2003), and intersperse them with student activities in order to create deeper learning experiences and give space to possible "delayed understandings" (Entwhistle 2009, Scheja 2002).
- 6) Try to design step-by-step learning progressions through a week-by-week increase in the complexity of research methodologies used by different disciplines. (This part will probably be very experimental, because it might be difficult to assert the existence of an obvious and purposeful sequencing of learning goals across multiple disciplines (Felder & Silverman 1988). Alternatively, I will try to confront students with types of problems which invite an increasingly open-ended choice of methodology.

With these changes in course design I will be able to make progress in moving away from a feeling of fragmentation and towards a sense of congruence. There is still a long way to go, but with more personal experience as teacher and a better integration into the community, I might get there eventually.